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ABSTRACT

Critical thinking skills were taught to students in a lower-track freshman English class through the use of cross-disciplinary subject matter. Given a set of three transmission electron micrographs, or photographs of magnified tissue used in histology and pathology, students were asked to support their conclusions on which two of micrographs A, B, and C were alike. In the next two class periods, students were given another set of micrographs, but this time they were asked to determine which one of three micrographs was similar to micrograph A. As before, the students determined very quickly which micrographs were similar, but had difficulty defending their conclusions. As an aid in differentiating the photographs, students were asked to jot down each micrograph's characteristics. While examining their material, students realized that some ideas were not arranged logically or consistently. They noted, too, that the ordering of items was not consistent and reordered them. From these reordered notes, students made an outline and wrote a paper. This approach helped students recognize analysis; demonstrated the relationship of perceptual, thinking, and writing skills; provided an assignment related to another discipline; connected the process of prewriting to writing; provided a realistic context for comparison/contrast and for classifying and ordering ideas; and demonstrated the necessity of close observation and precision of expression. (Materials used in the study are appended.) (HOD)

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COMPOSITION AND SCIENCE: A SYMBIOTIC RELATIONSHIP

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The process of writing has a variety of theories; they range from Emig's study of the composing process to Shaughnessy's extensive listing of errors, from Moffett's Universe of Discourse to Odell's compendium of research on writing in the workplace. These theories stress the point that all writing, regardless of intent, audience, or level, has a process that lends itself to a purpose. All too often, we find that the writing assignments in the freshman English classes become as artificial as the audience, no matter how we attempt to manipulate the student writers' impressions and use of audience. Thus, students have difficulty connecting assignments to the reality of what they are doing in other course work. There is a vacuum in student writing that has caused a lethargy in both students and teachers of composition. The question becomes: are the students writing to please the sensibilities of the instructor, or to gain a skill that will help them to synthesize, analyze, and, finally, understand a particular topic or concept? We find the former to be the case in a great many of our composition classes.

In the interchanges we have with our colleagues from other disciplines, their refrain that students are unprepared to write or to grasp basic concepts is becoming stronger and, in some cases, louder than before. From those who most teach composition comes the answer that we are trying to teach a variety of writing skills with a limited amount of time and interdisciplinary knowledge. We share our colleagues' concern that students are unprepared to enter other disciplines with adequate writing and critical thinking skills. Now, then, should we approach the problem?

According to Emig, the "[w]riting evokes a different kind of activity from the process we know as talking."[1] The difficulty with traditional writing assignments is that we ask students to write a mode of discourse in a vacuum; that is, we ask them to write a description without an end in mind or to use only one form of analysis without providing contexts from other disciplines. We propose that critical thinking skills can be taught in the English composition classroom through the use of cross-disciplinary subject matter. We designed the following in-class writing assignment to demonstrate to students the connections between the writing process and critical thinking.

Students in a lower-track freshman English class were given a set of three transmission electron micrographs (photographs of magnified tissue used in histology and pathology), one of which was very different from the other two, and asked to draw and support a conclusion as to which two were alike (Attachment I). One student immediately determined which two micrographs were similar and others readily agreed, but all of the students had a great deal of difficulty defending their choices. When pressed, they focused on the most obvious similarity--both micrographs contain two dark circles located within two larger circles. When pressed further to be more precise, they began to consider ways of making their descriptions more vivid and precise. They also decided to order their ideas spatially, moving from the top to the bottom of the micrographs. We did no work on the board and students left the session feeling a bit dazed.

At the next two class periods students were given another set of micrographs (see Attachment II), but this time they were asked to

[1]Emig, Janet, Composing Process of Twelfth Graders, (NCTE Rpt. #13: Urbana, Ill.) 1971.

determine which one of these micrographs was similar to micrograph A. Once again students very quickly determined which micrographs were similar but again had difficulty defending their conclusion. To aid them, we asked them to cite the characteristics of each of the micrographs. As they did so, we jotted those characteristics on the board. Students randomly cited such characteristics as the number, shape, and thickness of lines, not paying attention to the ordering of material.

After some discussion, and with direction from us, students decided that the best way to support their contention that micrographs A and E were similar was to build a case for the elimination of micrographs B and C. They then decided to make a sub-heading entitled "Elimination of Micrograph C" and listed three characteristics that differentiated it from A, first citing the shape of the bottom line, second citing the number of lines, and third citing a wave-shaped line that does not appear in A.

Next, the class made a sub-heading entitled "Elimination of Micrograph B" and listed the details that differentiated micrograph B from A, first citing the number of lines, second using a triangular shape that does not appear in A and third citing a thick line that doesn't appear in A.

Finally, students constructed a sub-heading entitled "Micrographs A and D Are Similar," citing first, the fact that in each there is a dock-head shape in the upper right hand corner, second, that each contains seven white horizontal lines and third, that three-fourths of the way from the top of the page the white lines fade as they move to the right.

As students examined the material on the board, they realized that the ideas were not arranged logically or consistently. They noted that Louis demanded that we discuss the elimination of micrograph B before we discuss the elimination of micrograph C. They noted, too, that the ordering of items under the sub-headings was not consistent and re-ordered them.

Once we completed this preliminary work, students were asked to write a paper based on the outline on the board. As one student noted, the pre-writing took slightly longer than the actual writing of the first draft (we devoted sixty or sixty-five minutes to the discussion and forty or forty-five to the writing). This assignment, and others like it, achieves several things:

1. It makes students aware that analysis is analysis is analysis, whether it occurs in science or English classrooms;
2. It demonstrates the relationship of perceptual, thinking and writing skills;
3. It gives students an assignment that is clearly related to another discipline;
4. It connects the process of pre-writing to writing through demonstration;
5. It gives students a realistic context for comparison/contrast;
6. It gives students a realistic context for classifying and ordering ideas;
7. It gives students a sense of the necessity of close observation and precision of expression.

When we asked students to think aloud, to jot down their perceptions for later examination, to make judgments and defend them, they became more articulate about the subject matter and began to realize that writing and thinking are intimately connected.

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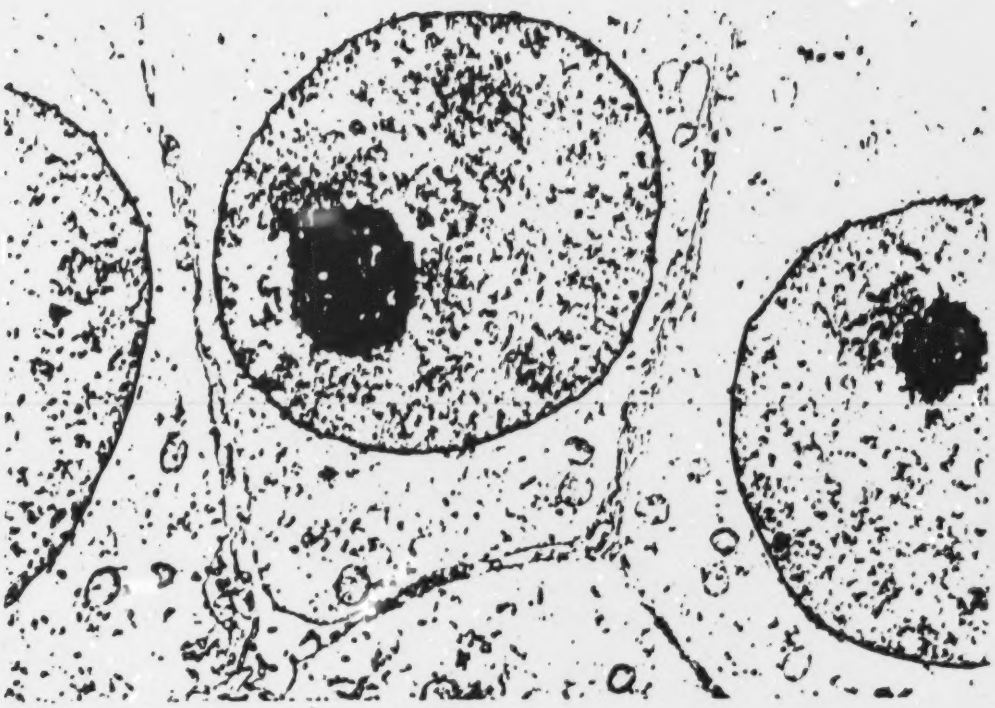

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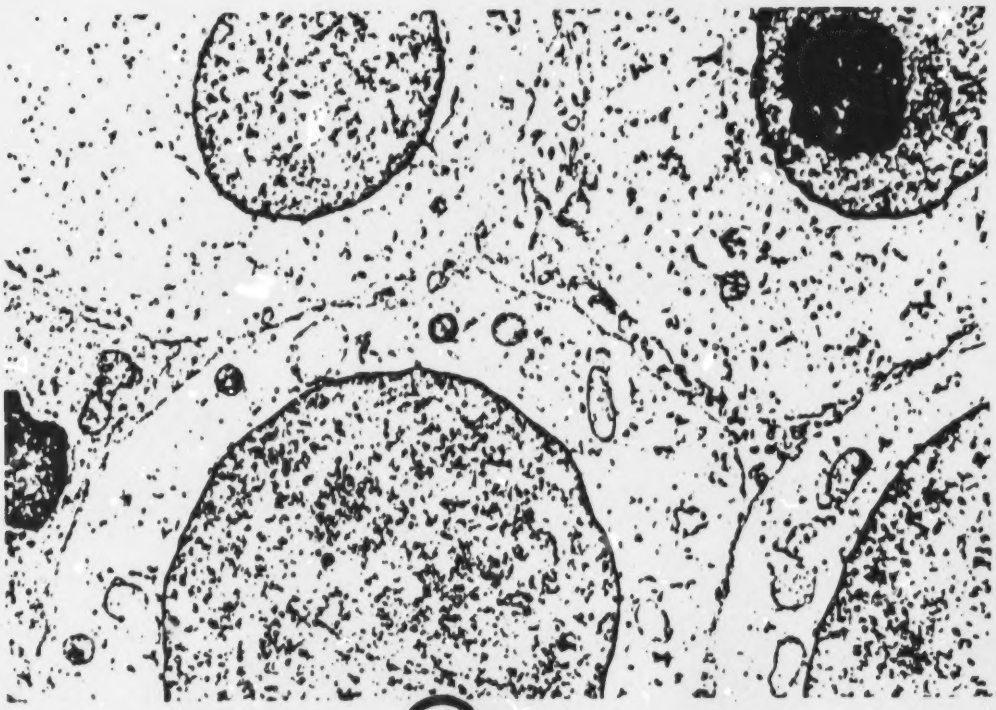

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